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AMENDMENTS TO THE DRAWINGS

Please amend Figure 1. The amended figure accompanies this paper.

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RESPONSE

Amendment to the drawings

Figure 1 is amended to include the step of washing the oil phase with water 108 which as was shown in original Figure 1 produces therefrom treated oil phase 110. Support for the amended drawing may be found in the application as filed at page 5, lines 20-25 which states:

The reaction product 106 between the acid and the petroleum feed is fed to a separation/washing section 20. The reaction product separates into two phases, an oil phase and an aqueous spent acid phase. The oil phase is separated and washed with water 108 to remove residual acid and produce a treated oil phase 110. The treated oil phase 110 is then sent to a desulfurization operation 30. Equipment in the separation/washing section 20 may include liquid-liquid extractors, coalescers, and the like.

Claim Rejections – 35 U.S.C. §103

The Examiner has rejected claim 1 as being obvious over the cited reference Kanhofer (U.S. Patent No. 2,336,736) in view of Rappas et al (U.S. Patent No. 6,406,616). In neither the '736 reference nor in the '616 reference, taken either singly or in combination, is there any teaching of selectively reacting polyene compounds in a hydrocarbon fuel prior to oxidative desulfurization, let alone contacting the polyene compounds with sulfuric acid amounting to 0.5-10 vol% of the hydrocarbon. As the Applicants' specification points out, oxidant consumption is very large when desulfurization is applied to feeds containing large amounts of cracked, unstable compounds such as polyenes e.g. dienes. Such compounds compete strongly with the sulfur compounds for the oxidant; i.e. little sulfur oxidation takes place until almost all of the polyenes (e.g. dienes) react with the oxidant incurring highly detrimental wet chemical costs and process economics (see Applicants' application as filed at page 2, lines 10-21). If one is forced to oxidize dienes and sulfur compounds simultaneously, residence time for the hydrogen peroxide in the reactor will increase, leading to

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increased degradation of the peroxide. Hence yields are reduced and process economics are poorer.

There is no teaching whatsoever, nor any suggestion of, the pre-treatment of polyenes in the cited patents, '736 and '616. Indeed, the Rappas reference ('616) actually teaches away from the Applicants' claims, stating:

"the olefinic compounds which contribute to the octane rating of the hydrocarbon fuel. Octane rating is the resistance of the hydrocarbon fuel to burn. The higher the rating, the slower the burn when ignited during the compression burn cycle of the piston. Higher octane allows for better control of burning for high compression engines."

(see Rappas et al. ('616) at column 4 lines 7-15). Applicants' contend that claim 1 is not made obvious over the cited references, and respectfully request that the ground for rejection of claim 1 be withdrawn.

Claims 2-12 depend from claim 1. For the reasons stated above, Applicants respectfully assert therefore that claims 2-12 are therefore non-obvious over the cited references. Applicants request that this ground for rejection of claims 2-12 be withdrawn. Applicants respectfully request that the ground for rejection of claims 2-12 be withdrawn.

The Examiner has also rejected claim 13 as being obvious over the cited reference Kanhofer (U.S. Patent No. 2,336,736) in view of Rappas et al (U.S. Patent No. 6,406,616). However, Applicants respectfully contend that the same argument applies, as recited above, with respect to claim 1. Applicants claim 13 recites the step of pre-treating the fuel before oxidation by contacting the fuel with sulfuric acid of strength 80-98 wt% in an amount of 0.5-10 vol% of the fuel (see Applicants Application as filed at page 31, lines 18-22). As discussed above in neither the '736 reference nor in the '616 reference, taken either singly or in combination, is there any teaching of selectively reacting polyene compounds in a hydrocarbon fuel prior to oxidative desulfurization, let alone contacting the polyene compounds with sulfuric acid amounting to 0.5-10 vol% of the hydrocarbon. As the Applicants' specification points

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out, oxidant consumption is very large when desulfurization is applied to feeds containing large amounts of cracked, unstable compounds such as polyenes e.g. dienes. Such compounds compete strongly with the sulfur compounds for the oxidant; i.e. little sulfur oxidation takes place until almost all of the polyenes (e.g. dienes) react with the oxidant incurring highly detrimental wet chemical costs and process economics (see Applicants' application as filed at page 2, lines 10-21). Indeed the Rapas reference ('616) actually teaches away from the Applicants' teaching (see Rappas et al. ('616) at column 4 lines 7-15).

Therefore, Applicants' respectfully contend that claim 13 is non-obvious over the cited references. Applicants request that this ground for rejection of claim 13 be withdrawn.

Claims 14-19 depend from claim 13. For the reasons stated above, Applicants respectfully assert therefore that claims 14-19 are non-obvious over the cited references. Applicants request that this ground for rejection of claims 14-19 be withdrawn, and respectfully request that these claims 14-19 be allowed.

CONCLUSION

Applicants believe that the Examiner's objections have been overcome by amendment, and rejections have been overcome by argument, and respectfully assert that the claims are in condition for allowance.

Respectfully submitted,

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Dated: *15 Sept 2006*

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